WE CLAIM:

1. A light source, comprising:

light emitting diode (LED) dies capable of emitting LED light;

optical couplers for coupling light from respective LED dies;

phosphor patches disposed between the LED dies and the optical couplers to convert at least a portion of the LED light propagating to the optical couplers from respective LED dies; and

an intermediate layer disposed between the LED dies and the phosphor patches, the intermediate layer transmitting the LED light and reflecting light converted in the phosphor patches, the intermediate layer having a first side facing the LED dies and a second side facing the couplers, the phosphor patches being disposed on the second side of the intermediate layer.

2. A light source as recited in claim 1, wherein the LED dies are arranged in a regular array.

3. A light source as recited in claim 1, wherein the LED dies are encapsulated.

4. A light source as recited in claim 1, wherein the LED dies are disposed on a substrate.

5. A light source as recited in claim 4, further comprising at least one stand-off disposed between the intermediate layer and the substrate.

6. A light source as recited in claim 1, wherein the couplers are reflective couplers formed by apertures through a coupler sheet, the apertures having reflective side walls.

7. A light source as recited in claim 6, wherein the phosphor patches register with respective apertures.

8. A light source as recited in claim 6, wherein the phosphor patches extend into the apertures from the intermediate layer.

9. A light source as recited in claim 1, further comprising a reflective layer disposed to reflect LED light that has passed through the phosphor layer back to the phosphor layer.

10. A light source as recited in claim 1, further comprising a set of optical fibers disposed to receive light from respective couplers.

11. A light source as recited in claim 1, further comprising a power supply connected to provide electrical current to the plurality of LED dies.

12. A light source, comprising:

two or more light emitting diode (LED) dies to produce LED light;

two or more respective couplers for coupling light from the LED dies;

an intermediate layer disposed between the LED dies and the couplers, the intermediate layer being substantially transparent to the LED light; and

a phosphor layer disposed on the intermediate layer, between the intermediate layer and the couplers, for converting at least a portion of the LED light to light at a converted wavelength.

13. A light source as recited in claim 12, wherein the LED dies are arranged in a regular array.

14. A light source as recited in claim 12, wherein the LED dies are encapsulated.

15. A light source as recited in claim 12, wherein the LED dies are disposed on a substrate.

16. A light source as recited in claim 15, further comprising at least one stand-off disposed between the intermediate layer and the substrate.

17. A light source as recited in claim 12, wherein the couplers are reflective couplers formed by apertures through an aperture sheet, the apertures having reflective side walls.

18. A light source as recited in claim 12, wherein the phosphor layer is provided as patches of phosphor-containing material distributed on the intermediate layer, the patches being located at positions corresponding to areas of the intermediate layer illuminated by the LED dies.

19. A light source as recited in claim 18, wherein the couplers are formed in apertures through an aperture sheet, the patches registering with the apertures.

20. A light source as recited in claim 19, wherein the patches of phosphor-containing material extend into the apertures from the intermediate layer.

21. A light source as recited in claim 19, wherein the intermediate layer reflects light at the converted wavelength.

22. A light source as recited in claim 19, further comprising a reflective layer disposed to reflect LED light that has passed through the phosphor layer back to the phosphor layer.

23. A light source as recited in claim 12, wherein the intermediate layer reflects the converted light.

24. A light source as recited in claim 12, further comprising a set of optical fibers disposed to receive light from respective optical couplers.

25. A light source as recited in claim 12, further comprising a power supply connected to provide electrical current to the LED dies.

26. A light source, comprising:

a plurality of light emitting diode (LED) dies capable of emitting LED light;

a first layer disposed over the LED dies, the first layer being substantially transparent to the LED light, the LED light propagating through the first layer from a first side of the first layer to a second side of the first layer; and

a phosphor layer disposed on the second side of the first layer.

27. A light source as recited in claim 26, wherein the LED dies are arranged in a regular array.

28. A light source as recited in claim 26, wherein the phosphor layer is provided as patches of phosphor-containing material distributed on the first layer, the patches being located at positions corresponding to areas of the first layer illuminated by the LED dies.

29. A light source as recited in claim 26, wherein the first layer reflects light converted by the phosphor layer to a longer wavelength than the wavelength of the LED light.

30. A light source as recited in claim 26, further comprising a reflective layer disposed to reflect LED light that has passed through the phosphor layer back to the phosphor layer.

31. A light source as recited in claim 26, wherein the LED dies are arranged on a substrate.

32. A light source as recited in claim 31, further comprising at least one stand-off between the substrate and the first layer.

33. A method of assembling a light source, comprising:

providing a plurality of light emitting diode (LED) dies capable of emitting LED light;

disposing a layer of phosphor on a first layer, the first layer being substantially transparent to the LED light;

positioning the first layer and the layer of phosphor over the LED dies so that LED light passes through the first layer from the LED dies to the layer of phosphor.

34. A method as recited in claim 33, wherein disposing the layer of phosphor on the first layer comprises disposing the layer of phosphor as patches on a surface of the first layer, the positions of the patches on the first layer corresponding to areas where light passes from the LED dies through the first layer.

35. A method as recited in claim 33, wherein providing the plurality of LED dies comprises arranging the LED dies in a regular array pattern.

36. A method as recited in claim 33, wherein providing the plurality of LED dies comprises providing the plurality of LED dies on an LED subassembly, and further comprising attaching the LED subassembly to the first layer.

37. A method as recited in claim 36, wherein one of the LED subassembly and the first layer comprises a plurality of stand-offs, and attaching the LED subassembly to the first layer comprises attaching the stand-offs to the other of the LED subassembly and the first layer.

38. A method as recited in claim 33, wherein providing the intermediate layer comprises providing an intermediate layer that transmits the LED light and that reflects light that is wavelength converted in the phosphor layer.

39. A method as recited in claim 33, further comprising providing a reflector layer to reflect LED light that has passed through the phosphor layer back to the phosphor layer.